

Introduction

Preparing for, responding to, and recovering from pandemic influenza will require a strategy with many similarities to other disease outbreaks, be they naturally occurring or resulting from terrorist action. The goals of prevention and control of these outbreaks, and the time-honored public health activities to lessen the impact on morbidity and mortality, namely, education, vaccination, prophylaxis, isolation/quarantine, and the closure of public facilities are common to all, despite the particular disease of concern. In addition, clear, concise communication with the public, within the Department of Health and Senior Services (DHSS), and with other agencies remains a critical component, as does the ability of the involved agencies to achieve collaboration and coordination.

DHSS has Emergency Response Plans in place that have been tried, tested, and exercised for all aspects of response and recovery, including those mentioned above relating to disease surveillance, investigation, and control. Where necessary, details or public information templates unique to pandemic influenza have been added into the existing plan and this plan. This plan outlines the pandemic mechanics from the federal level and lists pandemic specific job duties for DHSS staff and the roles of partnered agencies and organizations.

A broad, diverse and geographically dispersed group of agencies and organizations, representing the length, breadth, and interests of the state collaborated with the DHSS in completing the annexes of this plan. With committees organized under the umbrella of the Missouri Homeland Security Council, over four hundred representatives from hospitals, poultry corporations, local health departments, other state agencies, funeral homes, laboratories, financial institutions, fire departments, local and state governments, school boards, utility companies, universities, nursing homes and coroner's offices, among others, engaged with DHSS providing input and expertise to produce a meaningful plan.

DHSS has primary responsibility to safeguard the health of the people of the state and all its subdivisions and will respond in the event of pandemic influenza to limit the impact on public health. These actions will limit the impact on the social and economic infrastructure of the state. DHSS will serve to support the local public health agencies in this effort, and lead the response of a coordinated multitude of federal, state, local, and private organizations and agencies.

The following pages lay out the specific responsibilities for both DHSS and coordinated agencies and organizations during the phases of pandemic response.

Organization

Department of Health and Senior Services

For Organizational Chart and Description of Divisions see: www.dhss.mo.gov/AboutDHSS

Purpose of Plan

This plan is designed primarily to guide the operational response of the DHSS to pandemic influenza in Missouri, though segments of information contained within the plan will prove useful to guide activities of planners in other state agencies, at the local level, and to the general public. The plan is intended to provide the process and informational resources for an effective response of DHSS to pandemic influenza resulting from natural causes or a terrorist release. An effective response will reduce the impact on public health (i.e. reduce illness and save lives) and maintain essential services while minimizing economic loss. The following response plan will be implemented after a novel influenza strain begins to spread readily from person-to-person (the advent of phase 4 as declared by the World Health Organization), and is directed toward action and specific responsibilities for Departmental staff directing functional units. This plan for pandemic influenza response integrates with the current DHSS Emergency Response Plan, which would direct these activities into a National Incident Management System compliant Incident Command System as needed.

Definition of Influenza

Pandemic influenza refers to a global influenza epidemic that, in contrast to seasonal influenza: 1) is a novel influenza virus that has undergone an “antigenic shift”; 2) has high population susceptibility worldwide; 3) shows evidence of high person-to-person transmissibility; and 4) is spread over a broad range of geographic areas, causing unusually high rates of morbidity and mortality because of its virulence.

Background

Epidemics of influenza occur annually in the United States, and the DHSS manages ongoing programs of education, surveillance, control, and prevention to minimize the effects of these epidemics.

The primary disease prevention strategy for epidemic influenza includes

- Targeted vaccination and antiviral usage aimed at high-risk populations so as to minimize the effects of expected outbreaks.
- Public information and education.
- Enhanced surveillance.
- Isolation, quarantine, public facility closures, and other control measures.
- The DHSS’ Pandemic Influenza Response Plan (this document) would be implemented as a part of the State’s Emergency Response Plan. Notification of a pandemic influenza would come from the Center for Disease Control and Prevention in phases as outlined later in this document.

If an unexpected epidemic should occur as a result of a known circulating strain of influenza, parts of the pandemic flu plan would be implemented to minimize the outbreak. The parts implemented would depend upon the specifics of the outbreak and would be determined in consultation with Centers for Disease Control and Prevention, DHSS experts, local public health agencies, and local and state elected officials.

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Pandemic Influenza: How Does an Influenza Pandemic Start?

There are three main types of influenza viruses: A, B, and C. While influenza C causes only mild disease and has not been associated with widespread outbreaks, influenza types A and B cause epidemics nearly every year. Influenza A viruses are divided into subtypes, based on differences in two surface proteins: hemagglutinin (H) and neuraminidase (N). Influenza B viruses are not divided into subtypes. During an influenza season, usually one or more influenza A subtype and B viruses circulate at the same time.

A pandemic is possible when an influenza A virus makes a dramatic change (i.e., "shift") and acquires a new H or H+N. This shift results in a new or "novel" virus to which the general population has no immunity. The appearance of a novel virus is the first step toward a pandemic. In order to cause a pandemic, the novel influenza A virus must also spread easily from person-to-person causing serious disease. Influenza B viruses do not undergo shift and do not cause influenza pandemics.

The reservoir for type A influenza viruses is wild birds; but influenza A viruses also infect animals such as pigs and horses, as well as people. The last two pandemic viruses were combinations of bird and human influenza viruses. Many believe that these new viruses emerged when an intermediate host, such as a pig, was infected by both human and bird influenza A viruses at the same time, creating a new virus. Events in Hong Kong in 1997, however, showed that this is not the only way that humans can become infected with a novel virus. Sometimes, an avian influenza virus can "jump the species barrier" and move directly from chickens to humans to cause disease.

Since, by definition, a novel virus is a virus that has never previously infected humans, or has not infected humans for a long time, it is likely that almost no one will have immunity or antibodies to protect them against the novel virus. Therefore, anyone exposed to the virus--young or old, healthy or weak--could become infected and get sick. If however, the novel virus is related to a virus that circulated long ago, older people who might have been exposed to it in their childhood could have some level of immunity. It has been suggested that because of immunity issues, a novel virus might strike hardest at healthy young adults – an age group not usually considered at risk of severe illness or death from annual influenza. Such widespread vulnerability in the population could lead to a potentially devastating pandemic. (*Source: Centers for Disease Control and Prevention*)

Assumptions in Planning

Pandemic preparedness planning is based on assumptions regarding the evolution and impacts of a pandemic. Defining the potential magnitude of a pandemic is difficult because of different severity levels and virulence between the three 20th century pandemics. While the 1918 pandemic resulted in an estimated 500,000 deaths in the U.S., the 1968 pandemic caused an estimated 34,000 U.S. deaths. Similarities between the 20th century pandemics include the fact

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that in each, about 30 percent of the U.S. population developed illness, with about half seeking medical care. Children have tended to have the highest rates of illness, though not of severe disease and death. Geographical spread in each pandemic was rapid and virtually all communities experienced outbreaks.

This Pandemic Influenza Response Plan is based on assumptions derived from known evidence and expert opinion. The plan does not make predictions; rather, it reflects historical circumstances and current developments. These assumptions are necessary for scaling the plan to some workable format. However, adjustments may be made (and can be made) within the response if some of the assumptions prove to be false or otherwise inadequate.

Guiding Principles in Pandemic Influenza Response

DHSS will be guided by the following principles in initiating and directing its response activities:

- 1) DHSS will base levels of preparedness and response, in coordination with the United States Department of Health and Human Services (DHHS) on the World Health Organization's (WHO) Pandemic Plan and Pandemic Phase guidance.
- 2) DHSS will follow the guidance and direction of the DHHS' Pandemic Influenza Response Plan on the prioritization of groups for distribution of vaccine and antivirals, and maintain consistency with federal agency guidance on laboratory diagnostics, case definitions, clinical management, surveillance, and so forth.
- 3) DHSS will follow the concepts and principles of the National Response Plan and the National Incident Management System in planning and response.
- 4) DHSS will work to build a flexible response system determined, in addition to the above, by the epidemiological features of the virus and the course of the pandemic.
- 5) DHSS will provide honest, accurate, and timely information to the public.
- 6) In advance of an influenza pandemic, DHSS will work with federal, state, and local government partners, and the private sector to coordinate pandemic influenza preparedness activities to achieve interoperable response capabilities.
- 7) In advance of an influenza pandemic, DHSS will encourage all Missourians to be active partners in preparing local communities, workplaces, and homes for pandemic influenza and will emphasize that a pandemic will require Missourians to make difficult choices. An informed and responsive public is essential to minimizing the health effects of a pandemic and the resulting consequences to society.
- 8) DHSS will strive to ensure that preparations made for an influenza pandemic will benefit overall preparedness for any public health emergency or disease outbreak and serve to build capability and capacity to protect the health of all Missourians.
- 9) In advance of an influenza pandemic, DHSS, in concert with federal and local partners, will work to achieve statewide reliable, efficient, and rapid distribution mechanisms for vaccine and antiviral drugs through the Strategic National Stockpile and local stockpiles.
- 10) Clusters of human-to-human transmission anywhere in the world leading to the WHO declaration of phase 4 will trigger initiation of a pandemic response in Missouri. Because we live in a global community, a human outbreak anywhere means risk everywhere.
- 11) DHSS, with federal and local partners, will attempt to prevent an influenza pandemic or delay its emergence in the state by striving to arrest isolated outbreaks of a novel

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influenza (through isolation, quarantine, travel restrictions, public facility closures, etc.) wherever circumstances suggest that such actions might be successful. At the core of this strategy will be basic public health measures (such as hand washing) to reduce person-to-person transmission.

- 12) At the onset of an influenza pandemic, DHSS will work with the federal government to procure virus vaccine and distribute it to local public health departments for pre-determined priority groups, based on pre-approved local plans. For additional information, refer to the [Vaccine Storage and Distribution Annex](#) and [Antiviral Storage and Distribution Annex](#).
- 13) At the onset of an influenza pandemic, DHSS, in collaboration with federal and local partners, will begin to distribute and deliver antiviral drugs from public stockpiles to healthcare facilities and others with direct patient care responsibility for treatment of the ill from the novel influenza virus.

Pandemic Influenza: Assumptions Concerning Initial Response to a Pandemic

- A new pandemic will be due to a new subtype of influenza A.
- Emergence of new influenza A viruses is inevitable.
- Preparations should be geared toward a 1918 level pandemic. In Missouri, this would extrapolate to (without effective interventions) approximately 1.8 million ill; 900,000 seeking outpatient care; 198,000 hospitalizations; and 38,610 deaths. (*Source: Centers for Disease Control and Prevention*)
- An influenza pandemic of this magnitude will affect all segments of society, and could overwhelm health care and mortuary systems, severely disrupt commerce and economic activity, breakdown normal societal patterns, and cause psychosocial trauma.
- An effective response to such a pandemic will require a coordinated community-wide effort from local, state, and federal agencies, private businesses, individual citizens, elected officials, and religious leaders.
- Risk groups for severe and fatal infections cannot be predicted with certainty.
- A pandemic could occur in any month, not only during the typical influenza season.
- People who become ill may shed virus and can transmit infection for one-half to one day before they feel the onset of illness.
- The pandemic will occur in waves, with at least two waves likely. In an affected community, a pandemic wave will last about six – eight weeks with as little as 30 days between waves.
- Preparations should be made for outbreaks that will likely occur simultaneously across the state and nation, limiting the ability of any one jurisdiction to provide support and assistance to others.
- A new virus may be a re-emerging, previously known human virus subtype which has not recently been in circulation, or a virus of avian origin, emerging either through stepwise ‘adaptation’ conferring greater affinity for humans or through a process of genetic ‘reassortment’ between the genes of an avian and human virus.
- From time to time, avian influenza viruses will infect people directly exposed to infected poultry (as has been occurring mainly in the Far East since 1997) but may not necessarily evolve into pandemic viruses.

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- Such a strain could first emerge anywhere, including Missouri, but it is most likely to emerge in the Far East—the birthplace of recent pandemics—because:
 - Human proximity to ducks, other poultry and domestic pigs in farming communities in South East Asia and China, which facilitates mingling of human and animal viruses that may then exchange genetic material, resulting in a new ‘reassorted’ strain.
 - Viruses may directly transfer from birds (or animals) to humans and adapt to become genetically more likely to infect people.
 - Viruses may re-emerge from unrecognized or unsuspected reservoirs.
 - There is already wide dissemination of H5N1 infection in poultry, domestic fowl and wild birds.
- Whenever a new or novel influenza virus is isolated from an infected person, its potential to spread directly from person-to-person and cause outbreaks of illness needs to be assessed.
- False alarms are likely, but until it is known whether a new virus has developed which resulted in person-to-person transmission, its pandemic potential must remain under consideration and investigation.
- Vaccine for the novel influenza virus will not be available in Missouri before the virus reaches the state.
- Initial distribution of vaccine to Missouri will be extremely limited and must be prioritized to maximize effectiveness.
- Effective antivirals will be in limited supply and must be prioritized to maximize effectiveness.
- Education, public health interventions, basic public health measures, and social controls must be relied upon initially to slow the spread of the disease within Missouri.

Assumptions about pandemic disease

- Susceptibility to the pandemic influenza subtype will be universal.
- The clinical disease attack rate will be 30 percent in the overall population. Illness rates will be highest among school-aged children (about 40 percent) and decline with age. Among working adults, an average of 20 percent will become ill during a community outbreak.
- Of those who become ill with influenza, 50 percent will seek outpatient medical care.
- The number of hospitalizations and deaths will depend on the virulence of the pandemic virus. Estimates differ about 10-fold between more and less severe scenarios. Vulnerable age groups cannot be predicted with certainty. During annual fall and winter influenza season, infants and the elderly, people with chronic illnesses, and pregnant women are usually at higher risk of complications from influenza infections. In contrast, during the 1918 pandemic, most deaths occurred among young, previously healthy adults.
- The typical incubation period (the time between acquiring the infection until becoming ill) for influenza averages two days. We assume this would be the same for a novel strain that is transmitted between people by respiratory secretions.
- People who become ill may shed the virus and can transmit infection for one-half to one day before the onset of illness. Viral shedding and the risk for transmission will be

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greatest during the first two days of illness. Children will shed the greatest amount of virus and, therefore are likely to pose the greatest risk for transmission.

- On average a single ill person will transmit about two secondary infections. Some estimates from past pandemics have been higher, with up to three secondary infections per primary case.
- In an affected community, a pandemic outbreak will last about six – eight weeks. At least two pandemic disease waves are likely. Following the pandemic, the new viral subtype is likely to continue circulating and to contribute to seasonal influenza.
- The seasonality of a pandemic cannot be predicted with certainty. The largest waves in the U.S. during 20th century pandemics occurred in the fall and winter. Experience from the 1957 pandemic may be instructive in that the first U.S. cases occurred in June but no community outbreaks occurred until August and the first wave of illness peaked in October.